Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1. (canceled)

2. (currently amended) A method for updating soft decision information based on at least one observed signal into higher confidence information in a system, wherein a process affecting the at least one observed signal is modeled as a finite state machine (FSM), represented by a reduced-state trellis representation, receiving a plurality of FSM inputs and producing a plurality of FSM outputs, said FSM inputs being defined on a base set of symbols, and wherein said soft decision information corresponds to said FSM inputs, the method comprising: ~~In a digital information processing system wherein a model of a finite state machine (FSM) receiving a plurality of FSM inputs and producing a plurality of FSM outputs is represented by a reduced-state trellis and wherein said FSM inputs are defined on a base set of symbols, a method for updating soft decision information on said FSM inputs into higher confidence information, the method comprising:~~

(a) inputting said soft decision information in a first index set;

(b) performing forward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce forward state metrics ~~processing a forward recursion on said input soft decision information based on said reduced-state trellis representation to produce forward state metrics~~;

(c) performing backward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce backward state metrics ~~processing a backward recursion on said input soft decision information based on said reduced-state trellis representation to produce backward state metrics~~, wherein said backward recursion does not take into account decisions on said FSM inputs generated from said forward recursion;

(d) operating on said forward state metrics and said backward state metrics to produce said higher confidence information; and

(e) outputting said higher confidence information.

3. (original) The method of claim 2, further comprising the steps of:

(f) modifying said input soft decision information using said output higher confidence information via a feedback path; and

(g) repeating steps (a) to (f) until a termination condition is met.

4. (original) The method of claim 2, wherein said operating comprises at least one of the following operations: summing, multiplication, minimum, maximum, minimum*, maximum*, linear weighting and exponentiation.

5. (currently amended) The method of claim 2, wherein the step of performing forward recursion calculations ~~forward recursion processing~~ includes the steps of:

using residual state information to augment reduced-state trellis information to produce said forward state metrics; and

updating said residual state information.

6. (currently amended) The method of claim 2, wherein the step of performing backward recursion calculations ~~backward recursion processing~~ includes the steps of:

using residual state information to augment reduced-state trellis information to produce said backward state metrics; and

updating said residual state information.

7. (original) The method of claim 5, wherein said residual state information is a plurality of decisions on said FSM inputs.

8. (original) The method of claim 6, wherein said residual state information is a plurality of decisions on said FSM inputs.

9. (original) The method of claim 7, wherein said decisions on said FSM inputs are defined on a revised set of symbols, wherein said revised set of symbols is a partitioning of said base set of symbols.

10. (original) The method of claim 8, wherein said decisions on said FSM inputs are defined on a revised set of symbols, wherein said revised set of symbols is a partitioning of said base set of symbols.

11. (currently amended) The method of claim 2, wherein the ~~digital information processing~~ system is operative to perform at least one of the following functions:

iterative detection;

iterative decoding;

turbo detection;

turbo decoding;

message passing; and

belief propagation.

12. (original) The method of claim 2, wherein said finite state machine is operative to model at least one of the following:

a communication medium;

a storage medium; and

an imaging medium.

13. (original) The method of claim 2, wherein said finite state machine is operative to model at least one of the following:

allowable input and output pairs of a forward error correction code; and

a forward error correction encoder.

14. (original) The method of claim 2, wherein said finite state machine is operable to model a composite signal comprising at least one desired signal and at least one interference signal.

15. (currently amended) A method for updating soft decision information based on at least one observed signal into higher confidence information in a system, wherein a process affecting the at least one observed signal is modeled as a finite state machine (FSM), represented by a reduced-state trellis representation, receiving a plurality of FSM inputs and producing a plurality of FSM outputs, said FSM inputs being defined on a base set of symbols, and wherein said soft decision information corresponds to said FSM inputs, the method comprising: ~~In a digital information processing system wherein a model of a finite state machine (FSM) receiving a plurality of FSM inputs and producing a plurality of FSM outputs is represented by a reduced-state trellis and wherein said FSM inputs are defined on a base set of symbols, a method for updating soft decision information on said FSM inputs into higher confidence information, the method comprising:~~

(a) inputting said soft decision information in a first index set;

(b) performing forward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce forward state metrics and forward transition metrics ~~processing a forward recursion on said input soft decision information based on said reduced-state trellis representation to produce forward state metrics and forward transition metrics~~;

(c) performing backward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce backward state metrics and backward transition metrics ~~processing a backward recursion on said input soft decision information based on said reduced-state trellis representation to produce backward state metrics and backward transition metrics~~, wherein said backward recursion does not take into account decisions on said FSM inputs generated from said forward recursion;

(d) operating on said forward state metrics, said forward state transition metrics, said backward state metrics and said backward state transition metrics to produce said higher confidence information; and

(e) outputting said higher confidence information.

16. (original) The method of claim 15, further comprising the steps of:

(f) modifying said input soft decision information using said output higher confidence information via a feedback path; and

(g) repeating steps (a) to (f) until a termination condition is met.

17. (original) The method of claim 15, wherein said operating comprises at least one of the following operations: summing, multiplication, minimum, maximum, minimum*, maximum*, linear weighting and exponentiation.

18. (currently amended) The method of claim 15, wherein the step of performing forward recursion calculations ~~forward recursion processing~~ includes the steps of:

using residual state information to augment reduced-state trellis information to produce said forward state metrics; and

updating said residual state information.

19. (currently amended) The method of claim 15, wherein the step of performing backward recursion calculations ~~backward recursion processing~~ includes the steps of:

using residual state information to augment reduced-state trellis information to produce said backward state metrics; and

updating said residual state information.

20. (original) The method of claim 18, wherein said residual state information is a plurality of decisions on said FSM inputs.

21. (original) The method of claim 19, wherein said residual state information is a plurality of decisions on said FSM inputs.

22. (previously presented) The method of claim 20, wherein said decisions on said FSM inputs are defined on a revised set of symbols, wherein said revised set of symbols is a partitioning of said base set of symbols.

23. (previously presented) The method of claim 21, wherein said decisions on said FSM inputs are defined on a revised set of symbols, wherein said revised set of symbols is a partitioning of said base set of symbols.

24. (currently amended) The method of claim 15, wherein the ~~digital information processing~~ system is operative to perform at least one of the following functions:

iterative detection;

iterative decoding;

turbo detection;

turbo decoding;

message passing; and

belief propagation.

25. (original) The method of claim 15, wherein said finite state machine is operative to model at least one of the following:

a communication medium;

a storage medium; and

an imaging medium.

26. (original) The method of claim 15, wherein said finite state machine is operative to model at least one of the following:

allowable input and output pairs of a forward error correction code; and

a forward error correction encoder.

27. (original) The method of claim 15, wherein said finite state machine is operable to model a composite signal comprising at least one desired signal and at least one interference signal.

28. (currently amended) The method of claim 15, wherein the ~~digital information processing~~ system is a system performing iterative detection, iterative decoding, turbo detection, turbo decoding, message passing, or belief propagation.

29. (currently amended) A system for updating soft decision information based on at least one observed signal into higher confidence information, wherein a process affecting the at least one observed signal is modeled as a finite state machine (FSM), represented by a reduced-state trellis representation, receiving a plurality of FSM inputs and producing a plurality of FSM outputs, said FSM inputs being defined on a base set of symbols, and wherein said soft decision information corresponds to said FSM inputs, the system comprising: ~~A digital information processing system for updating soft decision information into higher confidence information by representing a model of a finite state machine (FSM) receiving a plurality of FSM inputs and producing a plurality of FSM outputs as a reduced state trellis, wherein said FSM inputs are defined on a base set of symbols, the system comprising:~~

means for inputting said soft decision information in a first index set;

means for performing forward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce forward state metrics ~~means for processing a forward recursion on said input soft decision information based on said reduced state trellis representation to produce forward state metrics~~;

means for performing backward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce backward state metrics ~~means for processing a backward recursion on said input soft decision information based on said reduced state trellis representation to produce backward state metrics~~, wherein said backward recursion does not take into account decisions on said FSM inputs generated from said forward recursion;

means for operating on said forward state metrics and said backward state metrics to produce said higher confidence information; and

means for outputting said higher confidence information.

30. (currently amended) A system for updating soft decision information based on at least one observed signal into higher confidence information, wherein a process affecting the at least one observed signal is modeled as a finite state machine (FSM), represented by a reduced-state trellis representation, receiving a plurality of FSM inputs and producing a plurality

of FSM outputs, said FSM inputs being defined on a base set of symbols, and wherein said soft decision information corresponds to said FSM inputs, the system comprising: ~~A digital information processing system for updating soft decision information into higher confidence information by representing a model of a finite state machine (FSM) receiving a plurality of FSM inputs and producing a plurality of FSM outputs as a reduced-state trellis, wherein said FSM inputs are defined on a base set of symbols, the system comprising:~~

means for inputting said soft decision information in a first index set;

means for performing forward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce forward state metrics and forward state transition metrics ~~means for processing a forward recursion on said input soft decision information based on said reduced-state trellis representation to produce forward state metrics and forward state transition metrics~~;

means for performing backward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce backward state metrics and backward state transition metrics ~~means for processing a backward recursion on said input soft decision information based on said reduced-state trellis representation to produce backward state metrics and backward state transition metrics~~, wherein said backward recursion does not take into account decisions on said FSM inputs generated from said forward recursion;

means for operating on said forward state metrics, said forward state transition metrics, said backward state metrics and said backward state transition metrics to produce said higher confidence information; and

means for outputting said higher confidence information.

31. (currently amended) A device for updating soft decision information based on at least one observed signal into higher confidence information, wherein a process affecting the at least one observed signal is modeled as a finite state machine (FSM), represented by a reduced-state trellis representation, receiving a plurality of FSM inputs and producing a plurality of FSM outputs, said FSM inputs being defined on a base set of symbols, and wherein said soft decision information corresponds to said FSM inputs, the device comprising: ~~A digital~~

~~information processing device for updating soft decision information into higher confidence information by representing a model of a finite state machine (FSM) receiving a plurality of FSM inputs and producing a plurality of FSM outputs as a reduced-state trellis, wherein said FSM inputs are defined on a base set of symbols, the device comprising:~~

a plurality of device inputs for inputting said soft decision information in a first index set;

a plurality of processing units for performing forward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce forward state metrics ~~processing a forward recursion on said input soft decision information based on said reduced-state trellis representation to produce forward state metrics~~, performing backward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce backward state metrics ~~processing a backward recursion on said input soft decision information based on said reduced-state trellis representation to produce backward state metrics~~, wherein said backward recursion does not take into account decisions on said FSM inputs generated from said forward recursion, and operating on said forward state metrics and said backward state metrics to produce said higher confidence information; and

a plurality of device outputs for outputting said higher confidence information.

32. (currently amended) A device for updating soft decision information based on at least one observed signal into higher confidence information, wherein a process affecting the at least one observed signal is modeled as a finite state machine (FSM), represented by a reduced-state trellis representation, receiving a plurality of FSM inputs and producing a plurality of FSM outputs, said FSM inputs being defined on a base set of symbols, and wherein said soft decision information corresponds to said FSM inputs, the device comprising: ~~A digital information processing device for updating soft decision information into higher confidence information by representing a model of a finite state machine (FSM) receiving a plurality of FSM inputs and producing a plurality of FSM outputs as a reduced-state trellis, wherein said FSM inputs are defined on a base closed set of symbols, the device comprising:~~

a plurality of device inputs for inputting said soft decision information in a first index set;

a plurality of processing units for performing forward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce forward state metrics and forward state transition metrics ~~processing a forward recursion on said input soft decision information based on said reduced-state trellis representation to produce forward state metrics and forward state transition metrics~~, performing backward recursion calculations on said reduced-state trellis representation using said input soft decision information to produce backward state metrics and backward state transition metrics ~~processing a backward recursion on said input soft decision information based on said reduced-state trellis representation to produce backward state metrics and backward state transition metrics~~, wherein said backward recursion does not take into account decisions on said FSM inputs generated from said forward recursion, and operating on said forward state metrics, said forward state transition metrics, said backward state metrics and said backward state transition metrics to produce said higher confidence information; and

a plurality of device outputs for outputting said higher confidence information.